

**UTAH**

**Division of Air Quality**

**ANNUAL REPORT**  
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# **Utah Division of Air Quality**

## **2004 Annual Report**

### **INTRODUCTION**

#### **Utah Division of Air Quality**

The mission of the Utah Division of Air Quality (DAQ) is to protect public health and the environment from the harmful effects of air pollution. To carry out this mission, Utah implements programs to ensure that Utah's air quality meets the health standards set by the U.S. Environmental Protection Agency (EPA).

In the past 25 years, Utah has made enormous strides in improving air quality. In the early 1980s, the health standards for four of the six criteria pollutants identified by EPA were violated in one or more Utah counties. Today, Utah attains all of the health standards, even after doubling its population.

Two of the six criteria pollutants identified by EPA, ozone and particulate matter (PM), occasionally reach levels that can affect the health and well being of Utah's urban residents who are more sensitive to pollution, such as children, the elderly, and those with chronic health problems. These pollutants can aggravate respiratory disorders during high pollution episodes and lead to chronic illness.

In rural areas of the state, air quality meets the health standards. However, areas located far from major population centers can be affected by industrial, automotive, or other air pollution that may contribute to health or visibility problems, or reduced crop yields.

Many of DAQ's resources are spent administering the federal Clean Air Act (CAA). Congress delegated authority to operate many programs to each of the states, with oversight by EPA. In Utah, authority resides with the Utah Air Quality Board (the Board), and DAQ serves as staff for the Board. Board membership is structured so as to provide representation to a diverse sampling of Utah's industries, local governments, environmental groups, and residents. The Director of DAQ is the Board's Executive Secretary.

The Utah Air Quality Rules (available on-line at <http://www.airquality.utah.gov>) set forth the requirements of the state air program, and illustrate the many ways in which DAQ interfaces with industry, other government agencies, and residents of the state. The air program mirrors the federal program to a large degree, but also includes oversight of air pollution sources not considered large enough by federal standards.

## 2004 Synopsis

Historically, Utah had problems meeting the National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO); however, it has been many years since violations occurred. DAQ submitted a re-designation request and associated maintenance plan to EPA for Provo City in March 2004. EPA has performed a transportation conformity adequacy review and approved the revised conformity budget. All other areas of historic CO problems are now in attainment of the CO NAAQS.

The year 2004 saw the continuation of an ongoing trend of progress toward compliance with all of the federal health standards for criteria air pollutants. Despite ever increasing numbers of people and their cars, Utah remained in compliance with both the 1-hour and 8-hour ozone standards. Our air monitors showed that we are very close to the standards, but measures taken in the past as well as continued cooperation by local residents on “no drive days” kept us in compliance.

The same can be said of our efforts to curb the levels of particulate matter. Throughout the state, we remained within the federal health standards for particulate matter smaller than 10 microns (one millionth of a meter) in diameter (PM<sub>10</sub>). However, DAQ has measured elevated concentrations of particulate matter smaller than 2.5 microns in diameter (PM<sub>2.5</sub>) in Cache Valley and North Salt Lake. DAQ is currently working to understand the sources of PM<sub>2.5</sub> in Cache Valley and North Salt Lake, and is developing control strategies for these emissions. High concentrations of particulate matter are brought on by wintertime episodes of air stagnation and temperature inversion. As such, there are always periods during the winter months when ambient concentrations approach the standards. Continued cooperation by the public on “no-burn days” has been a large part of our success.

The Utah Department of Environmental Quality (DEQ) further developed the Choose Clean Air program in 2004 by sponsoring an electronic mail server, known as a List Server or Listserv. Those who join are automatically notified by e-mail when unhealthy air pollution levels are forecast for the Wasatch Front. Information about the program and the Listserv can be found at <http://www.cleanair.utah.gov>.

The regional haze plan was amended in 2004 to reflect federal changes in requirements to reduce vehicle emissions. The plan will ensure that overall visibility continues to improve at the five national parks in Utah throughout the coming decades. The plan includes recommendations from the Grand Canyon Visibility Commission and a regional cap on sulfur dioxide emissions.

In 2004, DAQ in cooperation with Utah State University (USU), and the State of Idaho, began particulate studies for Logan and the surrounding Cache Valley area. These studies will help to determine the causes of elevated levels of PM<sub>2.5</sub> in the Cache Valley, as well as identify potential control measures that could be implemented to reduce particulate concentrations.

## **Division Organization**

The DAQ is divided into three separate branches: Permitting, Planning, and Air Standards. The Permitting Branch is responsible for issuing two kinds of permits: construction, and operating. Construction permits are issued to new or modified sources of air pollution through the New Source Review (NSR) program. Operating permits are issued, on an ongoing basis, through Title V of the CAA. In addition, the Small Business Assistance Program has been set up within the Permitting Branch to help small businesses deal with the many requirements surrounding air quality, including the various permitting requirements.

The Planning Branch is responsible for developing comprehensive plans to reduce air pollution. Emissions inventories are routinely compiled in order to understand the origins of the various contaminants detected in the air. Computer models are used to evaluate the impacts of new and existing sources of air pollution, and to understand the relationship between the emissions, meteorology, and pollutant concentrations measured in the air. The branch is also involved in the air quality impacts of transportation issues, including vehicle inspection and maintenance, clean fuels, and highway construction. All of this information must be considered in the development of State Implementation Plans (SIPs) in order to ensure that Utah's ambient air remains in compliance with the federal health standards, even as our population and our economy continue to grow.

The Air Standards Branch is responsible for ensuring that industries and residents are complying with Utah's air quality requirements, including activities associated with hazardous air pollutants (HAPs), asbestos, and lead based paints. The Air Standards Branch also includes the Air Monitoring Center, which operates a network of air quality monitors throughout the state.

## **AMBIENT AIR QUALITY IN UTAH**

### **Air Quality Standards**

The EPA has established health-based NAAQS for six pollutants known as "criteria pollutants." These are: carbon monoxide, lead, nitrogen dioxide, particulate matter, sulfur dioxide, and ozone. Each of these pollutants is addressed in greater detail later in this chapter, but Table 1 provides a brief description of each.

**Table 1. Criteria Pollutants**

NAME	SOURCE	HEALTH EFFECTS	ENVIRONMENTAL EFFECTS
<b>Carbon Monoxide (CO);</b> a clear, colorless, odorless gas	burning of gasoline, wood, natural gas, coal, oil, etc.	reduces ability of blood to bring oxygen to body cells and tissues; cells and tissues need oxygen to work. Carbon monoxide may be particularly hazardous to people who have heart or circulatory (blood vessel) problems and people who have damaged lungs or breathing passages	
<b>Lead</b>	paint (houses, cars), smelters (metal refineries); manufacture of lead storage batteries	brain and other nervous system damage; children are at special risk. Some lead-containing chemicals cause cancer in animals. Lead causes digestive and other health problems.	lead can harm wildlife
<b>Nitrogen Dioxide</b> (one component of NO <sub>x</sub> ); smog-forming chemical	burning of gasoline, natural gas, coal, oil, etc. Cars are an important source of NO <sub>2</sub>	lung damage, illnesses of breathing passages and lungs (respiratory system)	nitrogen dioxide is an ingredient of acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can reduce visibility
<b>Particulate Matter</b> (PM <sub>10</sub> , PM <sub>2.5</sub> ); dust, smoke, soot	burning of wood, diesel and other fuels; industrial plants; agriculture (plowing, burning off fields); unpaved roads	nose and throat irritation, lung damage, bronchitis, cardiac effects, early death	particulates are the main source of haze that reduces visibility
<b>Sulfur Dioxide</b>	burning of coal and oil, especially high-sulfur coal from the Eastern United States; industrial processes (paper, metals)	breathing problems, may cause permanent damage to lungs	SO <sub>2</sub> is an ingredient in acid rain (acid aerosols), which can damage trees and lakes. Acid aerosols can also reduce visibility
<b>Ozone</b> (ground-level ozone is the principal component of smog)	chemical reaction of pollutants; VOCs and NO <sub>x</sub>	breathing problems, reduced lung function, asthma, irritates eyes, stuffy nose, reduced resistance to colds and other infections, may speed up aging of lung tissue	ozone can damage plants and trees; smog can cause reduced visibility
<b>VOCs*</b> (volatile organic compounds); smog-formers	VOCs are released from burning fuel (gasoline, oil, wood, coal, natural gas, etc.), solvents, paints, glues and other products used at work or at home. Cars are an important source of VOCs. VOCs include chemicals such as benzene, toluene, methylene chloride and methyl chloroform	in addition to ozone (smog) effects, many VOCs can cause serious health problems such as cancer and other effects	in addition to ozone (smog) effects, some VOCs such as formaldehyde and ethylene may harm plants

\*All VOCs contain carbon (C), the basic chemical element found in living beings. Carbon-containing chemicals are called organic. Volatile chemicals escape into the air easily. Many VOCs are also hazardous air pollutants, which can cause very serious illnesses. EPA does not list VOCs as criteria air pollutants, but they are included in this list of pollutants because efforts to control smog target VOCs for reductions.

Source: United States Environmental Protection Agency, *The Plain English Guide to the Clean Air Act*, EPA 400-K-93-001, April 1993, page 24

The primary health standards are established by considering both the concentration level and the duration of exposure that may be incurred by an individual. Pollutant concentrations greater than the NAAQS are considered unhealthy. The NAAQS also include secondary standards to protect public welfare.



DAQ monitors each of these criteria pollutants, as well as several non-criteria pollutants for special studies.

### **Utah's Air Monitoring Network**

The Air Monitoring Center operates a network of monitoring stations across the state. These monitors are situated to measure air quality in neighborhoods, industrial areas, and along heavily traveled roadways. Figure 1 shows the location of current and historic monitoring sites in Utah. Table 2 shows the address of each of the monitoring stations, as well as the pollutants that are currently monitored there.

In addition, meteorological data are collected at many locations to provide localized data for air quality modeling that is used to evaluate the impacts of new sources and to assess the effectiveness of regional mitigation strategies.

**Figure 1. Utah Air Monitoring Network**



**Table 2. Utah Monitoring Stations**

Station	City	Address	CO	Lead	NO <sub>2</sub>	Ozone	PM <sub>10</sub>	PM <sub>2.5</sub>	SO <sub>2</sub>	Met.
Antelope Island	None	North end of island								X
Amalga	Amalga	6970 North 2400 West						X		
Badger Island	none	On Island								X
Beach	Lakepoint	12100 W. 1200 S.				X			X	X
Bountiful	Bountiful	171 W. 1370 N.			X	X		X	X	X
Brigham City	Brigham City	140 W. Fishburn Dr.				X		X		X
Cottonwood	SLC	5715 S. 1400 E.	X		X	X	X	X		X
Hyrum	Hyrum	100 North 480 West						X		X
Harrisville	Harrisville	425 W. 2250 N.				X		X		X
Hawthorne	SLC	1675 S. 600 E.	X		X	X	X	X		X
Herriman	Herriman	12950 S. 5600 W.				X		X		X
Highland	Highland	10865 N. 6000 W.				X		X		X
Lindon	Lindon	30 N. Main St.					X	X		X
Logan	Logan	125 W. Center St.	X			X	X	X		X
Magna	Magna	2935 S. 8560 W.		X			X	X	X	X
North Provo	Provo	1355 N. 200 W.	X		X	X	X	X		X
North Salt Lake	SLC	1795 N. Warm Springs Rd.					X	X	X	
Ogden #2	Ogden	228 32nd St.			X		X	X		
Salt Air	None	NW of SL Airport								X
Spanish Fork	Spanish Fork	312 W. 2050 N.				X		X		X
State Street	SLC	1401 S. State St.	X							
St. George	St. George	281 East 200 South			X	X		X		X
Syracuse	Syracuse	5100 West 1700 South								X
University Ave.	Provo	363N. University Ave.	X							
Washington Blvd.	Ogden	2540 S. Washington Blvd.	X							
West Jordan	West Jordan									X
Washington Terrace	Washington Terrace	4601 S. 300 W.						X		
West Valley	West Valley City	3275 W. 3100 S.	X			X		X		X

## **Criteria Air Pollutants**

### **Carbon Monoxide (CO)**

Carbon monoxide is produced primarily by motor vehicles. Other significant sources of CO emissions are wood burning stoves and fireplaces. The remaining emissions come from industrial facilities, construction equipment, miscellaneous mobile sources and other types of space heating.

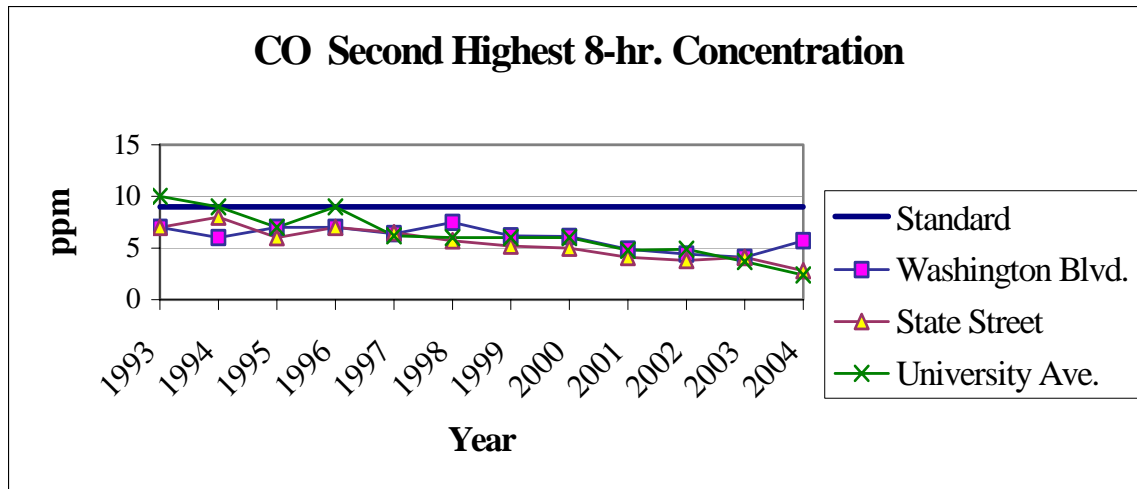
Because motor vehicle emissions are the major source of CO, the highest concentrations occur during the morning and evening rush hours. The worst problems are found near large concentrations of slow-moving vehicles, such as large parking lots, busy intersections, or traffic jams. CO problems are greater in winter due to several factors: cold weather makes motor vehicles run less efficiently, wood burning and other space heating takes place in the winter, and cold weather temperature inversions trap CO near the ground.

The NAAQS for CO includes two standards: a 1-hour standard of 35 parts per million (ppm), and an 8-hr standard of 9 ppm. Either of these values may be exceeded only once in a given year at any given location. Once a location measures a second exceedance of either standard, it is considered to be in violation of that standard and becomes designated as a “nonattainment area.” Three cities in Utah (Salt Lake City, Ogden, and Provo) were, at one time, designated nonattainment areas. Due primarily to improvements in motor vehicles, both Salt Lake City and Ogden were successfully redesignated back to “attainment” in recent years. Provo has also been attaining the CO standards now for several years, and DAQ submitted a re-designation request and associated maintenance plan for EPA’s approval in March 2004.

### **CO in 2004**

By all accounts, Utah was in compliance with the CO standards in 2004. Not one monitor recorded an exceedance of either standard. Although the final data from 2004 has yet to be quality assured, Figure 2 shows a 12-year trend in CO emissions. The steady decline is primarily due to improvements in automobile performance.

**Figure 2**



Another indicator of CO concentrations is the Air Quality Index (AQI). Based on a linear scale, the air quality is categorized as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Table 3 shows the number of days recorded for each category during each of the last seven years.

**Table 3. Air Quality Index (AQI) Summary Information for CO**

For calendar years 1998 - 2004

CO year	Number of Days With AQI Values Of:					
	good 0 - 50	moderate 51 - 100	unhealthy for sensitive grps. 101 - 150	unhealthy 151 - 200	very unhealthy 201 - 300	hazardous > 300
1998	319	46	0	0	0	0
1999	319	46	0	0	0	0
2000	337	29	0	0	0	0
2001	353	12	0	0	0	0
2002	360	5	0	0	0	0
2003	364	1	0	0	0	0
2004	297	9	0	0	0	0

2004 data through Oct. 31, 2004.

## Lead (Pb)

Lead in the ambient air exists primarily as particulate matter in the respirable size range. The major source of lead used to be gasoline. However, because leaded gasoline for automobiles was completely phased-out in the United States at the end of 1995, this is no longer a significant problem. The extraction and processing of metallic ores is currently

the major source of lead in Utah, and dust from the removal of lead-based paint is another.

The current standard for lead is a calendar quarter (3-month) average concentration, not to exceed 1.5 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) of air. Utah has not exceeded the health standard for lead since the late 1970s.

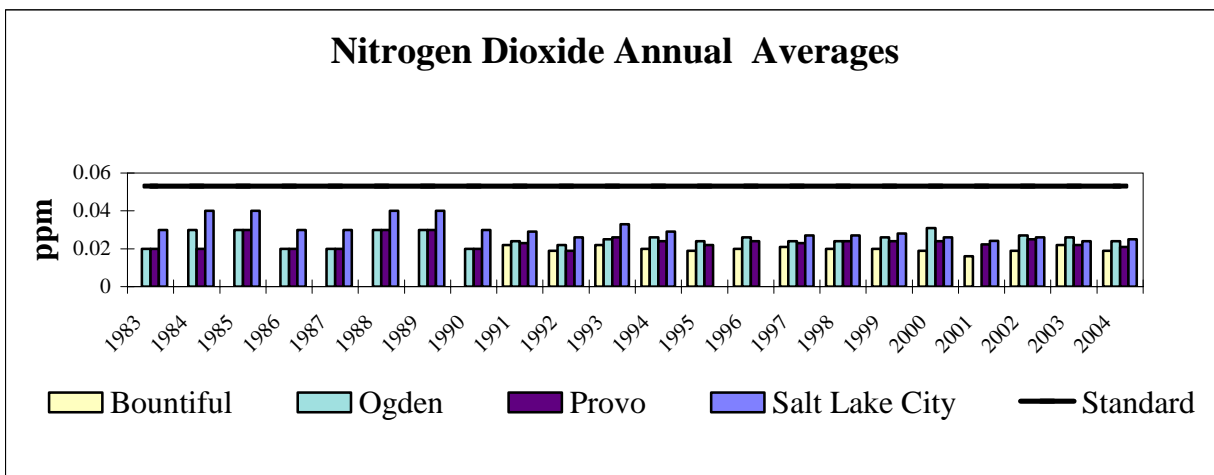
### Nitrogen Dioxide ( $\text{NO}_2$ )

During high temperature combustion, the nitrogen in the air reacts with oxygen to produce various oxides of nitrogen, or  $\text{NO}_x$ , a reddish-brown gas. One of the oxides of nitrogen, nitrogen dioxide ( $\text{NO}_2$ ), is considered a criteria pollutant.

DAQ monitors the concentrations of  $\text{NO}_2$  at various locations, but has never found there to be a likelihood of violating the annual standard of 0.053 ppm. However, these oxides of nitrogen tend to react with other air contaminants to form other criteria pollutants. In the summer, photochemical reactions with volatile organic compounds (VOCs) lead to ground-level ozone. In the winter,  $\text{NO}_x$  reacts with ammonia to form fine particulate matter.

Utah continues to struggle with both the ozone and particulate matter standards, and because of this, DAQ is mindful of the trend in  $\text{NO}_x$  emissions illustrated in Figure 3.

**Figure 3**



### Particulate Matter: $\text{PM}_{10}$ and $\text{PM}_{2.5}$

Particulate matter (PM) is the term given to the tiny particles of solid or semi-solid material found in the atmosphere. Particles ranging in size from less than a tenth of a micron (one millionth of a meter) all the way up to 50 microns are collectively called total suspended particulate (TSP). Anything larger tends to settle out of the air very

quickly. Particles 10 microns in size and smaller can lodge deep in the lungs and cause respiratory problems. They are called PM<sub>10</sub>. Recent health studies suggest that it is the particles 2.5 microns in size and smaller that pose the most serious health problems. This particulate matter is called PM<sub>2.5</sub>, and in 1997 EPA adopted new standards for PM<sub>2.5</sub>.

By far, the majority of man-made particulates would be termed PM<sub>10</sub>. PM<sub>10</sub> particles larger than 2.5 microns are typically due to “fugitive dust” (sand and dirt blown by winds from roadways, fields, and construction sites) and contain large amounts of silica (sand like) materials.

By contrast, PM<sub>2.5</sub> is generally due to combustion and includes fly ash (from power plants), carbon black (from cars and trucks), and soot (from fireplaces and woodstoves). Much of Utah’s PM<sub>2.5</sub> is called secondary aerosol. “Secondary” means that it was not emitted directly as a particle, but instead results when gasses such as sulfur dioxide (SO<sub>2</sub>) or NO<sub>x</sub> react with other gasses in the atmosphere such as ammonia (NH<sub>3</sub>) to become tiny particles. SO<sub>2</sub> and NO<sub>x</sub> are also products of combustion. These chemical reactions occur predominantly during cold weather, and Utah’s wintertime temperature inversions act to trap air in our valleys long enough for concentrations of secondary aerosol to build up to levels that can be unhealthy. Particles smaller than 2.5 microns are also major contributors to visibility-related problems in both urban and rural areas. Along the Wasatch Front, the effects can be seen as the thick brownish haze that lingers in our northern valleys, particularly in the winter.

DAQ presently operates PM<sub>10</sub> and PM<sub>2.5</sub> monitors throughout the state to assess the ambient air quality with respect to the standards for each. For PM<sub>10</sub>, the NAAQS are set at 50 µg/m<sup>3</sup> on an annual basis, and 150 µg/m<sup>3</sup> for a 24-hour average. For PM<sub>2.5</sub>, the standards are 15 µg/m<sup>3</sup> on an annual basis, and 65 µg/m<sup>3</sup> for a 24-hour average. Values for both PM<sub>10</sub> and PM<sub>2.5</sub> are averaged over three years making it possible to have concentrations that are above the standard and yet in compliance with the standard. EPA is currently reviewing both of these standards to verify that the current levels are protective enough of the public health.

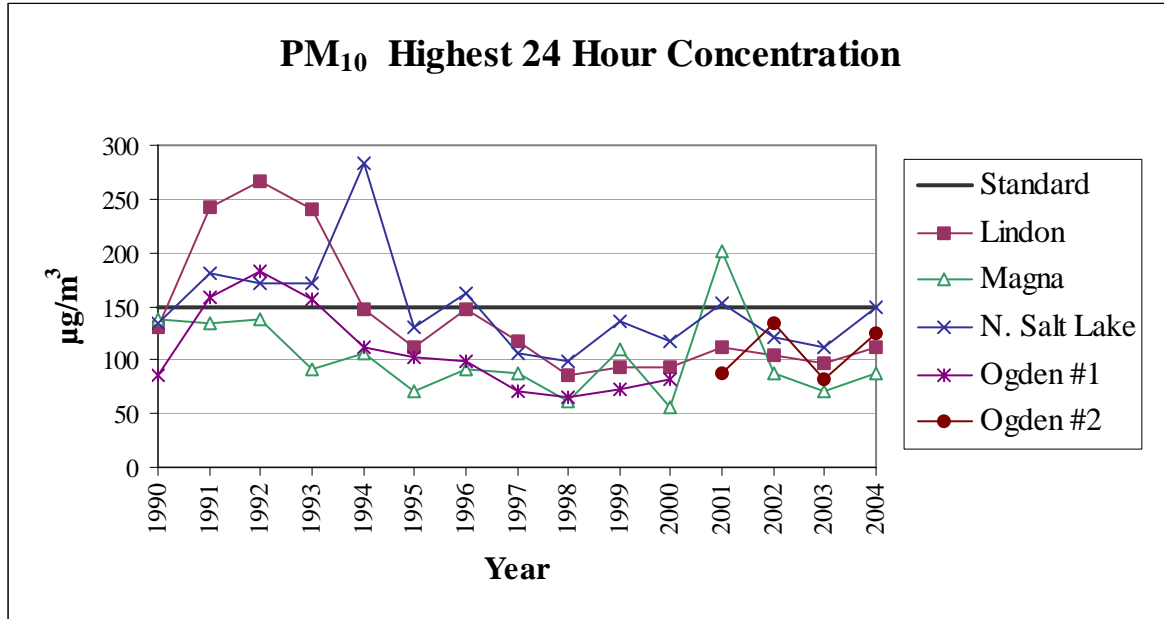
### **Particulate Matter in 2004**

Utah remained in compliance with all particulate matter standards in 2004. This marks 11 years of continued statewide compliance with the PM<sub>10</sub> standards, which is significant in that Utah has three areas that have been designated as nonattainment. Steps were taken in the early 1990s to bring these areas back into compliance with the health standards, and these efforts continue to pay dividends.

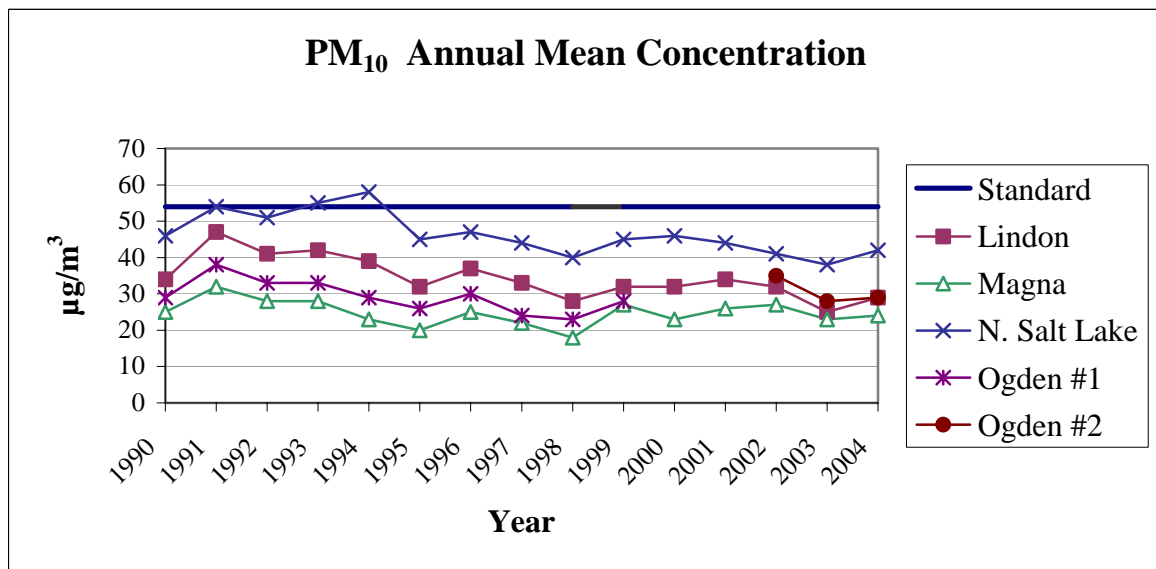
2004 also marks the fifth year that DAQ has been collecting PM<sub>2.5</sub> data, and although we may be close to the standards at some locations, we are nevertheless attaining the NAAQS at every monitor. Continued cooperation by the public on “no-burn days” has been a large part of our success, as have the measures taken to mitigate PM<sub>10</sub> concentrations in the early 1990s. Many of these measures were directed at precursors to secondary aerosols that count as both PM<sub>10</sub> and PM<sub>2.5</sub>.

Figures 4 through 7 show the recent trends in both PM<sub>10</sub> and PM<sub>2.5</sub>. Figure 6 shows a PM<sub>2.5</sub> concentration above the standard at the Logan monitor, and Figure 7 shows a PM<sub>2.5</sub> concentration above the standard at the North Salt Lake monitor. However, Utah remained in compliance with the PM<sub>2.5</sub> standard due to the three year averaging of concentrations.

**Figure 4**

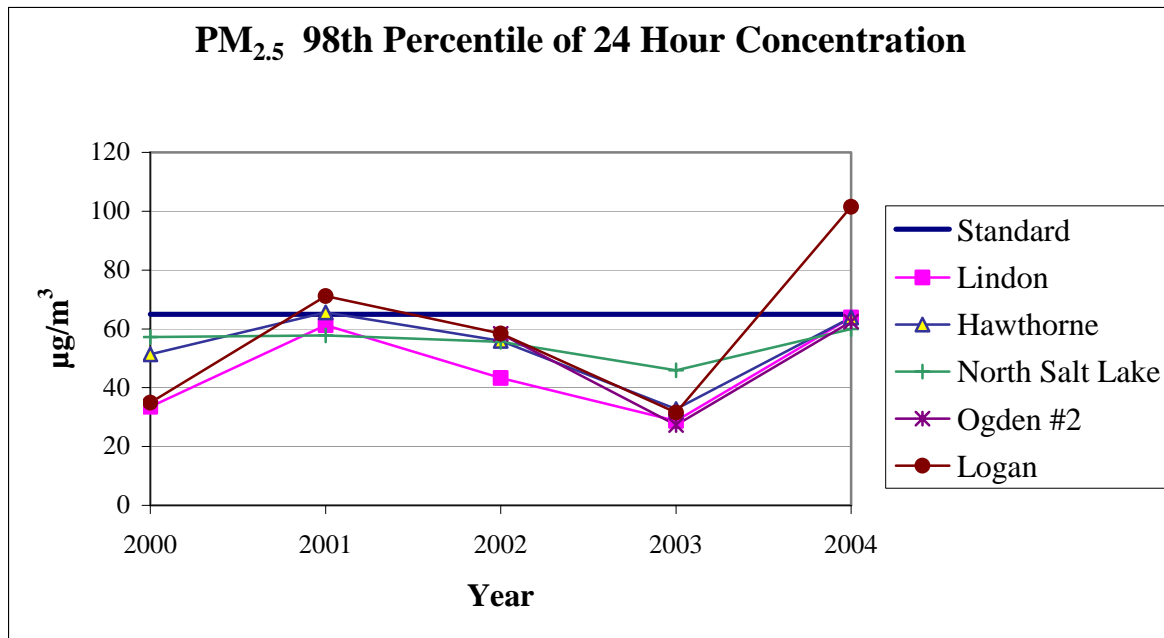


**Figure 5**

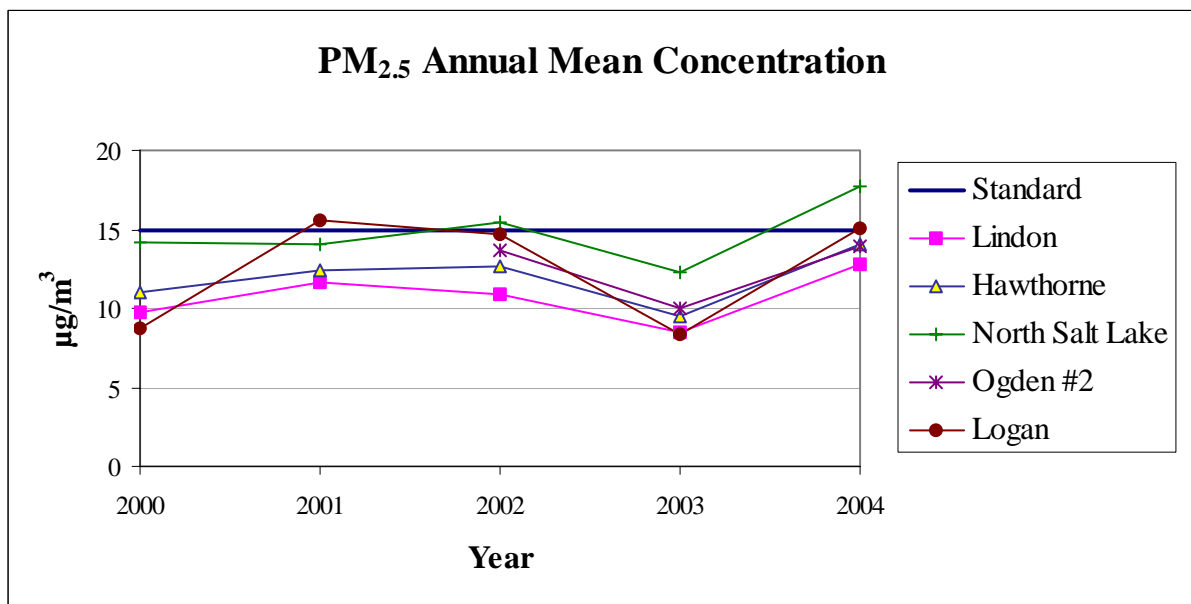




**Figure 6**



**Figure 7**



Another indicator of particulate concentrations is the AQI. Based on a non-linear scale, the air quality is categorized as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Tables 4 and 5 show the number of days recorded for each category during each of the last seven years for PM<sub>10</sub> and PM<sub>2.5</sub> respectively.

**Table 4. Air Quality Index (AQI) Summary Information for PM<sub>10</sub>**

For calendar years 1998 - 2004

PM <sub>10</sub> year	Number of Days With AQI Values Of:					
	good 0 - 50	moderate 51 - 100	unhealthy for sensitive grps. 101 - 150	unhealthy 151 - 200	very unhealthy 201 - 300	hazardous > 300
1998	269	96	0	0	0	0
1999	247	118	0	0	0	0
2000	245	121	0	0	0	0
2001	253	111	0	0	0	0
2002	261	103	0	0	0	0
2003	286	75	3	0	1	0
2004	246	119	1	0	0	0

**Table 5. Air Quality Index (AQI) Summary Information for PM<sub>2.5</sub>**

For calendar years 1998 - 2004

PM <sub>2.5</sub> year	Number of Days With AQI Values Of:					
	good 0 - 50	moderate 51 - 100	unhealthy for sensitive grps. 101 - 150	unhealthy 151 - 200	very unhealthy 201 - 300	hazardous > 300
1998	246	22	3	2	0	0
1999	293	59	11	0	0	0
2000	279	70	10	4	0	0
2001	263	75	15	12	0	0
2002	220	41	14	8	0	0
2003	285	70	10	0	0	0
2004	244	79	24	19	0	0

**Sulfur Dioxide (SO<sub>2</sub>)**

Sulfur dioxide is a colorless gas with a pungent odor. In the atmosphere, SO<sub>2</sub> is easily converted into sulfates, which are detected as particulates. It is also converted into sulfuric acid that is the major acidic component of acid rain. It is emitted primarily from stationary sources that burn fossil fuels (mainly coal and oil) such as power plants and refineries, and is also a byproduct of copper smelting and steel production. Diesel fuel, and to a lesser extent, gasoline contain sulfur and are considered contributors to SO<sub>2</sub> in the atmosphere.

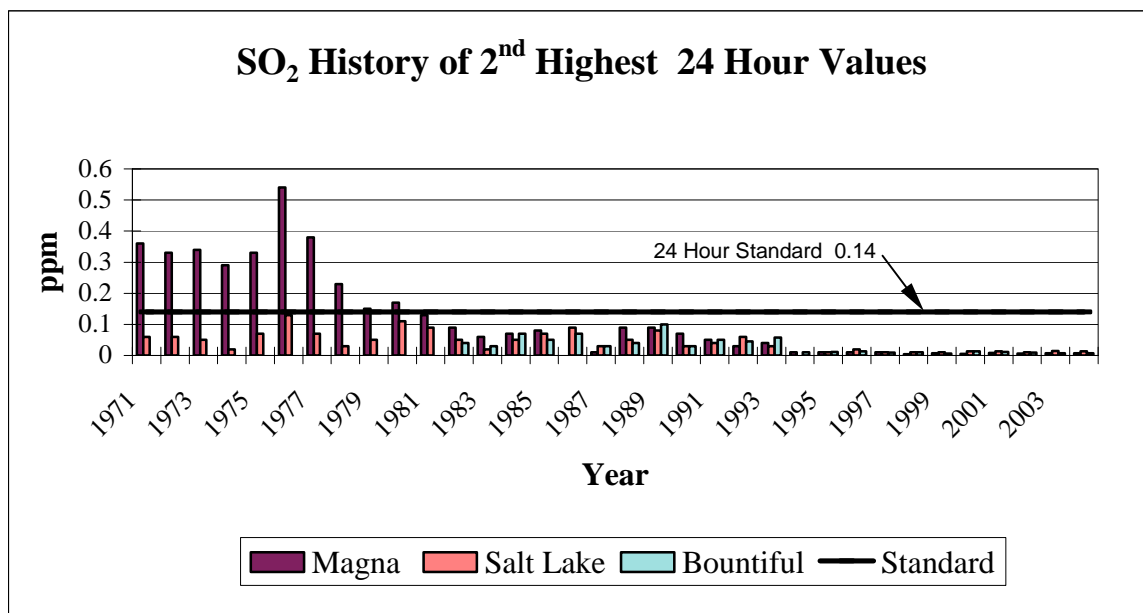
There are two primary health-based NAAQS for SO<sub>2</sub>: a 1-year average of 0.03 ppm, and a 24-hour average of 0.14 ppm. In addition there is a secondary welfare-related standard of 0.5 ppm averaged over a 3-hour period.

DAQ has situated its monitors near the largest sources of SO<sub>2</sub>: Kennecott Utah Copper Corporation (KUCC), and the five refineries along the Wasatch Front. Throughout the

1970s the Magna monitor routinely measured violations of the 24-hour standard. Consequently, Salt Lake County and Tooele County above 5600 ft were designated as non-attainment for SO<sub>2</sub>. Two significant technological upgrades by KUCC at the smelter have resulted in the reduction of SO<sub>2</sub> by hundreds of thousands tons per year as well as continued compliance with the SO<sub>2</sub> standard since 1981. In the mid 1990s, KUCC, Geneva Steel, the five refineries, and several other large sources of SO<sub>2</sub> made dramatic reductions in emissions as part of an effort to curb concentrations of secondary aerosol (sulfates) that were contributing to PM<sub>10</sub> violations. Utah will submit a maintenance plan and redesignation request for Salt Lake and Tooele Counties to EPA in April of 2005.

SO<sub>2</sub> measurements from 2004 indicate that Utah's ambient air is well within the federal health standards. Figure 8 shows the trend in SO<sub>2</sub> emissions over the past 34 years.

**Figure 8**



### Ozone (O<sub>3</sub>)

Ozone is formed when hydrocarbons (also known as volatile organic compounds, or VOCs) and nitrogen oxides (NO<sub>x</sub>) chemically react in the presence of sunlight and heat. Hydrocarbons are emitted from automobiles, gasoline stations, painting, degreasing, cleaning fluids, and many other sources. Plants also give off some reactive hydrocarbons, such as terpenes from pine trees. Nitrogen oxides are emitted by automobiles, power plants, and other combustion processes.

Ozone production is a year-round phenomenon. However, the highest ozone levels occur during the summer when strong sunlight, high temperatures, and stagnant meteorological conditions combine to drive the chemical reactions and trap the air in the region for

several days. Ozone produced under these conditions can then be transported many miles outside the urban area.

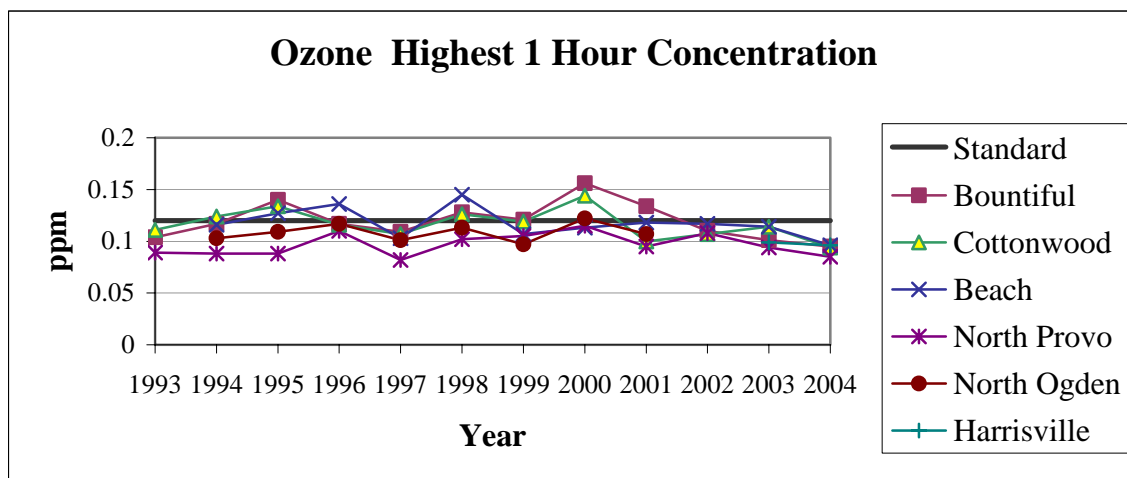
Ozone at ground level, where it can be inhaled, is a pollutant. Ground-level ozone should not be confused with the stratospheric ozone layer that is located approximately 15 miles high in the atmosphere. It is this layer that shields the earth from cancer-causing ultraviolet radiation.

On July 18, 1997 EPA issued a new ozone standard. The existing 1-hour standard of 0.12 ppm was replaced by an 8-hour standard at a level of 0.08 ppm. The new standard is based on health studies that indicate that long-term exposures to ozone are more harmful than short, 1-hour exposures.

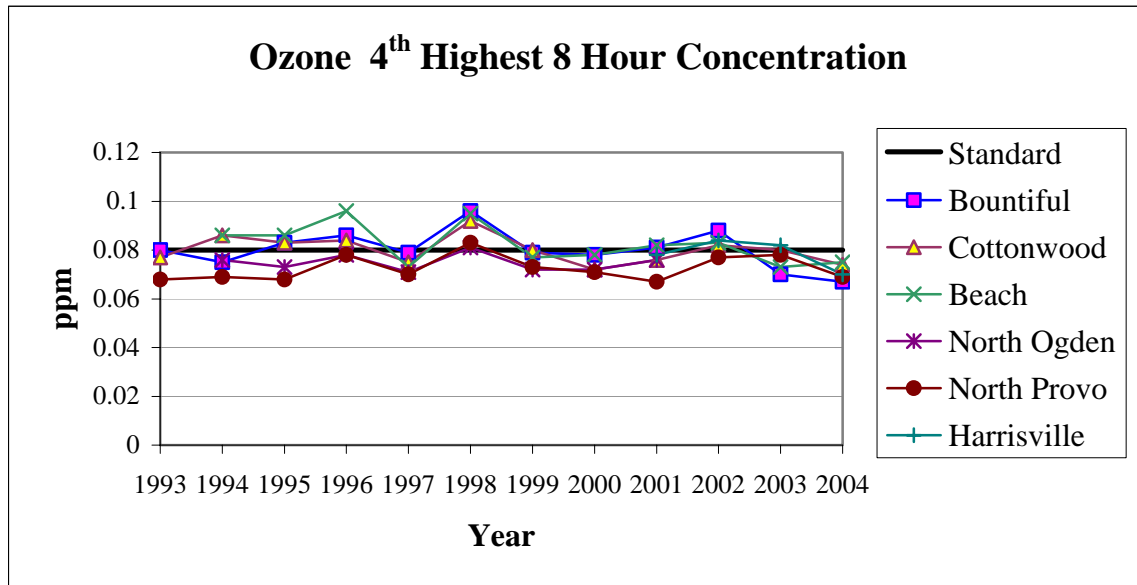
### Ozone in 2004

Utah remained in compliance with both ozone standards (which are based on two calendar years), but once again the margin of safety was slim. Ozone formation is weather dependent with higher concentrations occurring as temperatures increase. For this reason, ozone concentrations can vary greatly from on year to the next depending on fluctuations in weather patterns and ambient temperatures. The following charts illustrate recent trends in ozone concentrations along the Wasatch Front. Figure 9 shows the highest 1-hr concentrations recorded at a number of monitoring locations relative to the existing 1-hour standard (0.12 ppm). Figure 10 examines the new 8-hour standard (0.08 ppm) by looking at the 4<sup>th</sup> highest readings at selected monitors. Although we continue to comply with both of these standards, it is not uncommon to record values that are greater than the NAAQS.

**Figure 9**



**Figure 10**



Another indicator of ozone concentrations is the AQI. Based on a non-linear scale, the air quality is categorized as good, moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, or hazardous. Ozone is measured for 153 days each year from May 1<sup>st</sup> to September 30<sup>th</sup>. It is assumed that the air quality in northern latitudes would be categorized as good on the remaining days of the calendar year due to lower ambient temperatures and weather conditions that are not conducive to ozone formation. Table 6 shows the number of days recorded for each category during each of the last seven years.

**Table 6. Air Quality Index (AQI) Summary Information for Ozone**

For calendar years 1998 - 2004

Ozone year	Number of Days With AQI Values Of:					
	good 0 - 50	moderate 51 - 100	unhealthy for sensitive grps. 101 - 150	unhealthy 151 - 200	very unhealthy 201 - 300	hazardous > 300
1998	71	61	20	1	0	0
1999	84	62	6	1	0	0
2000	73	72	6	2	0	0
2001	80	67	4	2	0	0
2002	70	74	9	0	0	0
2003	69	77	7	0	0	0
2004	83	70	0	0	0	0

Utah ozone monitoring season is May 1 - Sept. 30; 153 days.

## **Emissions Inventories**

Each year DAQ collects information about the quantity and characteristics of the various air contaminants released by the many sources of air pollution throughout the state. The information is reviewed, quality assured, analyzed, and submitted to EPA. More detailed inventories are sometimes prepared to quantify emissions during specific seasonal episodes, but in any case, proper management of air quality issues within any given airshed begins with a reliable assessment of the emissions released into the atmosphere. In recent years, Utah has re-written its inventory rule to include all requirements of the federal Consolidated Emissions Reporting Rule (CERR). Utah has also made significant strides toward automating the collection of information from the major industry sources resulting in faster, quality checked inventories.

### **Sources of Air Contaminants**

Emission inventories are typically broken out into three categories of sources, namely point, area, and mobile. Industrial “point” sources are larger industrial or commercial facilities such as power plants, steel mills, and manufacturing facilities. Air pollutants released from these types of facilities are generally emitted through stacks, and have certain dispersion characteristics that are of interest to air quality specialists.

Smaller “area” sources may also be associated with industry or commerce, but because they appear in large numbers within urbanized areas, their emissions are estimated by various factors that are typically related to population density or economic indicators. Other area sources, such as space heating, are proportional to residential populations. Different categories of area sources are generally associated with different criteria pollutants. For instance, wood burning contributes mostly to particulate matter and carbon monoxide concentrations, while gas stations are associated with VOC emissions that contribute to ozone formation. Emissions that are not the result of human activity, also known as biogenic emissions, are also considered an area source, and make up the largest portion of VOC emissions in the statewide emissions inventory.

Mobile sources make up the third category. On-road mobile sources, like cars and trucks, are the primary contributors in this category. Estimating emissions from mobile sources requires an understanding of the various emission characteristics of the many types of vehicles and model years that make up the fleet, as well as an understanding of how they drive and the distance they travel. The mobile source category also includes off-road mobile sources, a diverse grouping of heavy construction equipment, small engines (lawnmowers and snowblowers), trains, and aircraft.

While compiling the 2002 statewide emissions inventory, it was found that biogenic VOC emissions had increased over 340,000 tons when compared to 1999. This was mainly due to a different model being used to estimate biogenic emissions in 2002 than was used in 1999. EPA estimates biogenic emissions using the latest version of the Biogenic Emissions Inventory System (BEIS) model. Version 3.12 of the BEIS model

was used for estimating 2002 biogenic emissions, while version 2 of BEIS was used for 1999.

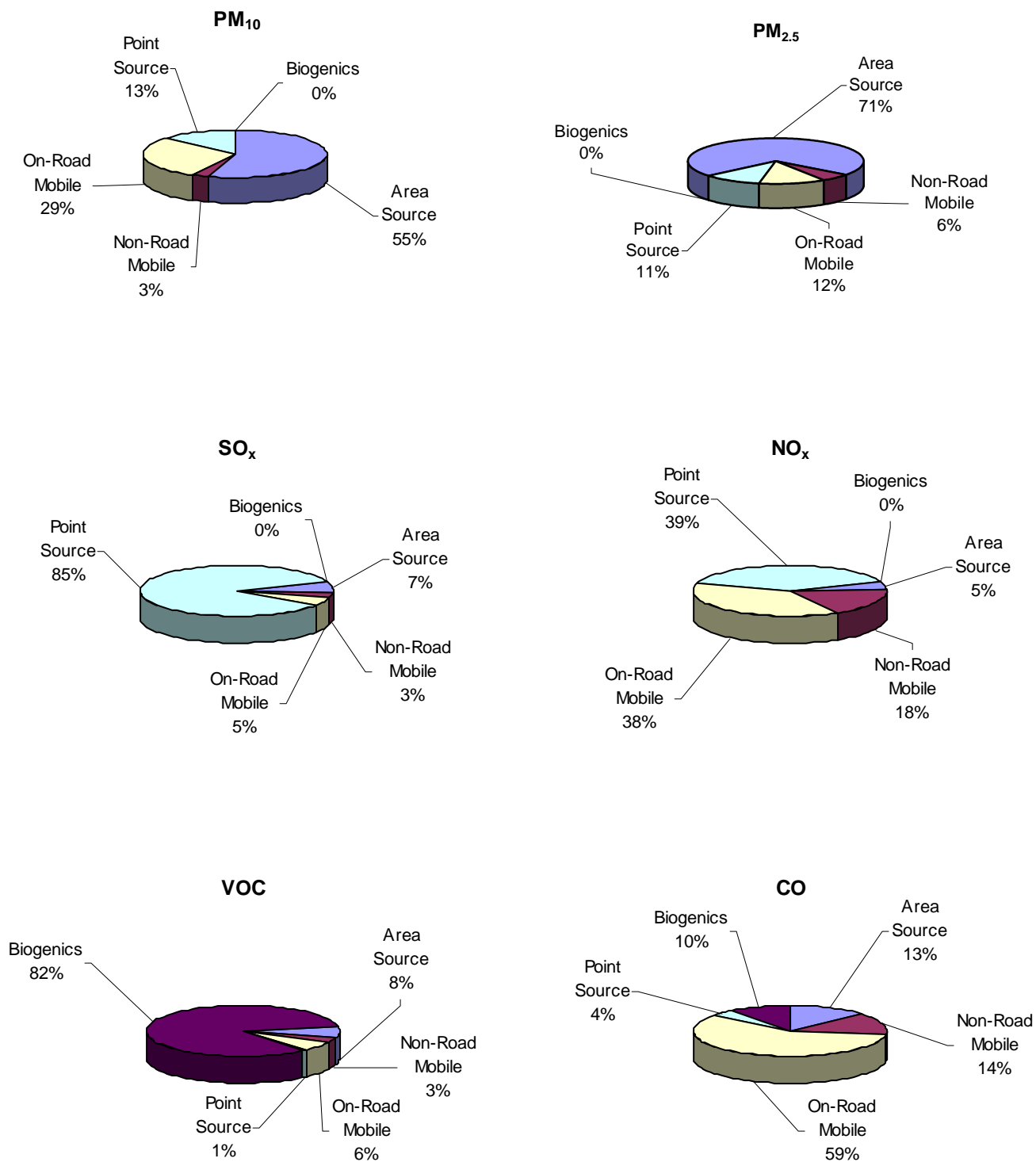
Table 7 shows, by county, the most recent statewide emissions inventory (2002) compiled by DAQ. The next statewide emissions inventory compiled will be for the calendar year 2005.

Figure 11 shows how these source categories contribute to the overall emissions inventories for the various criteria pollutants.

**Table 7. 2002 Criteria Pollutant Inventory (tons)**

<b>County Summary</b>	<b>PM<sub>10</sub></b>	<b>PM<sub>2.5</sub></b>	<b>SO<sub>x</sub></b>	<b>NO<sub>x</sub></b>	<b>VOC</b>	<b>CO</b>
<b>Beaver</b>	1,190	391	216	1,953	30,266	18,430
<b>Box Elder</b>	4,917	1,743	315	6,895	39,020	59,129
<b>Cache</b>	3,337	1,300	191	4,145	19,183	45,414
<b>Carbon</b>	1,304	467	8,082	5,884	18,045	24,693
<b>Daggett</b>	1,061	818	6	1,150	15,367	10,896
<b>Davis</b>	3,480	1,029	2,441	11,099	18,965	79,341
<b>Duchesne</b>	1,872	751	105	1,700	24,769	19,414
<b>Emery</b>	3,753	1,305	21,022	32,555	33,286	29,363
<b>Garfield</b>	5,155	4,024	95	1,638	51,387	51,471
<b>Grand</b>	4,906	3,827	58	2,904	42,489	55,050
<b>Iron</b>	2,465	880	531	4,060	41,333	39,255
<b>Juab</b>	1,937	570	309	4,220	30,115	60,912
<b>Kane</b>	750	205	89	564	48,948	16,544
<b>Millard</b>	3,624	1,274	4,458	31,398	52,473	38,941
<b>Morgan</b>	793	220	172	3,302	10,449	9,053
<b>Piute</b>	381	187	38	191	13,103	7,647
<b>Rich</b>	1,049	465	35	309	10,309	7,860
<b>Salt Lake</b>	13,823	4,274	5,992	46,841	51,409	287,796
<b>San Juan</b>	1,544	561	1,568	2,083	65,966	28,897
<b>Sanpete</b>	1,562	610	395	1,292	19,621	20,470
<b>Sevier</b>	1,726	615	438	2,334	20,350	30,163
<b>Summit</b>	2,888	1,509	296	4,770	22,839	38,690
<b>Tooele</b>	4,032	938	464	6,129	44,151	47,287
<b>Uintah</b>	1,732	669	83	1,452	31,684	23,048
<b>Utah</b>	6,183	1,863	904	13,425	37,011	121,196
<b>Wasatch</b>	849	233	49	1,155	18,976	14,388
<b>Washington</b>	2,631	822	282	4,645	58,796	57,054
<b>Wayne</b>	572	173	155	266	24,683	8,526
<b>Weber</b>	2,924	880	297	6,953	16,318	63,113
<b>Total</b>	<b>82,439</b>	<b>32,605</b>	<b>49,090</b>	<b>205,313</b>	<b>911,310</b>	<b>1,314,041</b>

**Figure 11. Source Categories for Emissions**





## PLANNING FOR THE FUTURE

The Planning Branch is responsible for developing SIPs in order to ensure that Utah's ambient air remains in compliance with the federal health standards, even as our population and our economy continue to grow. These plan revisions encompass a variety of different issues, but most often focus on areas of the state where the air quality was found to be unhealthy for one of the criteria pollutants.

In addition, the CAA now requires transportation planning organizations to prepare information detailing the air quality impacts associated with improvements in the transportation infrastructure. These plans must conform to the plans (SIPs) prepared by DAQ. Therefore, many of the current SIP revisions are undertaken with the goal of helping transportation planners adapt to an ever-growing population base.

### Recent Accomplishments

**REGIONAL HAZE SIP** – When the Clean Air Act was reauthorized by congress in 1990 it included provisions to improve visibility in large national parks and wilderness areas, and established a commission to determine the causes of poor visibility at the Grand Canyon. The Commission determined that many kinds of sources contribute to visibility impairment, and recommended strategies for improvement. These strategies were included in EPA's 1999 regulations as an option that western states could use in writing the visibility plans (SIPs) required of all states. Utah is one of five states that submitted plans in 2003 under this option. Key elements of the plan include using a regional cap on SO<sub>2</sub> emissions and a backstop market trading program to be triggered if emissions exceed the projected emissions cap. Other components reduce emissions from prescribed fire and require tracking emissions and visibility conditions every five years through 2018. In 2004, Utah's plan was amended to reflect federal changes in requirements to reduce vehicle emissions, and technical work is ongoing with other western states and tribes that are members of the Western Regional Air Partnership (WRAP) to prepare the plan updates that are due early in 2008. You can read more about the current plan at <http://www.airquality.utah.gov/SIP/Regionalhazesip/regionalhaze.htm>.

**PROVO CITY CARBON MONOXIDE** – Since January 2004, all Metropolitan Planning Organizations (MPOs) have been required to use the MOBILE6 Motor Vehicle Emissions Factor Model when demonstrating conformity to existing budgets, no matter how these budgets were constructed. In 2004, DAQ submitted a re-designation request and associated maintenance plan for Provo City CO. EPA has performed a transportation conformity adequacy review and approved the revised conformity budget. Revisions to both the Salt Lake City and Ogden City maintenance plans for CO have been submitted to EPA. In each case, the transportation conformity budget has been updated to reflect the use of MOBILE6. You can find the plan that was submitted to EPA @ <http://www.airquality.utah.gov/SIP/SIPPDF/1-Secixc6%20Provo%2026896.pdf>.

SULFUR DIOXIDE (SO<sub>2</sub>) - Salt Lake and eastern Tooele County have been in nonattainment status for sulfur dioxide for many years; DAQ has completed a draft Maintenance Plan showing that the area has had no violations of the health standard since 1981 and will remain in attainment for at least the next 10 years. The Plan will be completed early in 2005 and will be submitted to EPA with a request for redesignation to attainment. Kennecott Utah Copper's smelter, the largest source of sulfur dioxide emissions, has reduced emissions from more than 200,000 tons per year in the late 1970s to less than 20,000 tons per year since the early 1990s.

CACHE VALLEY PARTICULATE STUDIES – In 2004, DAQ, in cooperation with Utah State University (USU) and the State of Idaho, began particulate studies for Logan and the surrounding Cache Valley area. These studies will help to determine what control measures can be implemented to reduce particulate concentrations. Since the attainment area includes a portion of Idaho, the Idaho Department of Environmental Quality has installed particulate monitors in Preston and Franklin, Idaho, and has loaned USU their ammonia (NH<sub>3</sub>) monitoring trailer. DAQ has installed a new Filter Dynamics Monitor System (FDMS), and an NH<sub>3</sub> analyzer at the Logan site. We have also installed two additional Cache Valley particulate monitors, one in Hyrum, and one in Amalga. Current monitoring data is available at <http://www.airmonitoring.utah.gov/f-current.htm>.

## **Upcoming Projects**

PM<sub>10</sub> – The PM<sub>10</sub> SIP for Utah and Salt Lake Counties is being revised using, for the first time, a photochemical grid model. The plan will demonstrate attainment and maintenance of the PM<sub>10</sub> NAAQS for a period of at least 10 years, and hence qualify the areas for redesignation to attainment for PM<sub>10</sub>. Ogden City is also included in the modeling domain, and will qualify for redesignation as well. The transportation conformity budgets will be developed using the latest mobile source emissions model. This plan is being developed with extensive stakeholder involvement. More information is available at <http://airquality.utah.gov/SIP/PM10SIP/index.htm>.

OZONE PLAN – All areas of the state were officially designated as attainment areas for the new 8-hour ozone standard in 2004, and the 1-hour ozone standard will be revoked in 2005. To complete the transition to the new ozone standard, the State of Utah must demonstrate that the Salt Lake/Davis County ozone maintenance area will continue to maintain the new 8-hour ozone standard for the next 10 years. The plan will be submitted to EPA by 2007. DAQ is currently gathering the background information that will be needed for the plan, and will develop the new maintenance plan through a stakeholder review process.

PERMITTING PROGRAM – The federal permitting program for new and modified major sources was revised in December 2002, and Utah is required to update the state's permitting program by January 2006 to reflect these changes. DAQ has been evaluating the changes to the federal program, and initiated a stakeholder review process in 2004 that focused initially on how the revisions would affect major sources. The Division will continue to work with the stakeholders in 2005 to determine how to integrate these new

requirements into Utah's permitting program that applies to both major and minor sources. The Division is planning to bring recommended rule changes to the Air Quality Board in the summer of 2005.

EPA is still developing permitting requirements for the new 8-hour ozone and PM<sub>2.5</sub> standards. Utah may need to delay changes to the state's nonattainment area permitting rules to ensure that these new requirements are included in the program.

**DATABASE DEVELOPMENT** – DAQ secured contract services in 2004 for a Business Process Analysis and Database Development project that is scheduled to begin during spring 2005 and reach completion in early 2006. The project aims to provide a streamlined, accurate, and logical business data system through which customers and division employees can produce expedient business transactions. The system design will be flexible and capable of supporting new functionality as DAQ business requirements and goals evolve.

## **Ancillary Programs**

Within the community there are some familiar programs and information hotlines that have their roots in some of the air quality plans developed at DAQ. These include:

**WOODBURNING PROGRAM** (red-burn / green-burn) – This has its origin in a problem with meeting the health standard for PM<sub>10</sub>. Although originally met with some skepticism, the measurable success of this program has been outstanding, owing much to the voluntary cooperation of Wasatch Front residents. The program runs from November through early April of each year. In addition to the burning requirements, residents are encouraged to drive less and industry is encouraged to optimize operating conditions. Notification is given through the general media, or one can access the daily condition on the web at <http://www.airmonitoring.utah.gov>.

**VEHICLE INSPECTION/MAINTENANCE PROGRAMS** – Although not run directly by DAQ, the emissions portions of these programs have arisen because of problems attaining the federal health standards (NAAQS) for several pollutants, most notably carbon monoxide and ozone. These programs are administered by the counties.

**AIR QUALITY INDEX (AQI)** – The local newspapers routinely publish daily assessments of air quality. This information is compiled and disseminated by DAQ. Information is also available on the web at <http://www.airmonitoring.utah.gov>.

**NO DRIVE DAYS** – These are announced whenever the probability of exceeding the ozone standard is forecasted to be high. High temperature and stagnant air masses contribute to this probability. Residents are also encouraged to minimize driving when we approach the PM standards.

**CHOOSE CLEAN AIR** – An interactive source of information about ways individuals can help improve air quality by making smart choices in their personal lives may be found on the website at <http://www.cleanair.utah.gov>. The Utah Department of Environmental

Quality (DEQ) is also sponsoring an electronic mail server, known as a List Server or Listserv. Those who join will be automatically notified by e-mail when unhealthy air pollution levels are forecast for the Wasatch Front. Information about how to subscribe to the Listserv can be found at <http://www.deq.utah.gov/ListServe>.

## **PERMITTING**

The DAQ Permitting Branch is responsible for issuing permits to any source that emits any contaminant into the air. These permits often establish actual emission limits that can be measured, but it is not unusual to find surrogate limits such as production rates or limited hours of operation or combinations of these surrogates. Also common are limits on opacity, which is the transparency or opaqueness of the smoke that is emitted from a source.

The branch issues two types of permits. New Source Review (NSR) permits are basically construction permits that are called “approval orders” (AO). These are issued by the New Source Review Section and have been required since 1969. The Operating Permits Section issues the Title V Operating Permits to the larger sources in the state; there are approximately 100 of these sources. These operating permits basically consolidate all air quality related requirements into a single document, making it easier for the source to understand all of the many requirements with which they must comply. It is also easier to inspect for compliance with a consolidated document, as well.

In addition, the branch also processes a number of smaller actions such as de minimus determinations for NSR, name changes, tax exemption certificates for pollution control equipment purchases, and soil aeration approvals.

### **New Source Review**

Any new or modified source of air pollution in Utah is required to obtain an AO before it is allowed to construct. The application, called a Notice of Intent (NOI), is reviewed to make sure that the source is planning to use the best available control technology (BACT). BACT is a case-by-case determination that takes into account both the cost and the benefits of the control equipment. An approval order is written based on the NOI to ensure that the source will be operated in accordance with all applicable state and federal requirements.

The general public and EPA are given an opportunity to review the proposed approval order before it is issued. The criteria indicating which sources must obtain an approval order are specified in R307-401 of the Utah Administrative Code (UAC). Potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork. In fiscal year 2004 (7/1/03 to 6/30/04) the NSR section completed or was working on 282 different projects. This included the completion of 95 approval orders and 112 other projects.

## **Operating Permits**

Congress created Title V of the Clean Air Act in 1990. This Title requires states to issue an operating permit to the larger or “major” sources of air pollution within the state. Utah developed and submitted a program in 1994 that was approved by EPA in 1995. As stated above, a primary purpose of the permit is to consolidate the applicable air requirements from the many and varied locations such as approval orders, federal New Source Performance Standards (NSPS), National Emissions Standards for Hazardous Air Pollutants (NESHAP) and Maximum Available Control Technology (MACT) requirements. Like the approval orders, the general public is given an opportunity to review the draft operating permits before they are issued. In addition, EPA has up to 45 days to review the proposed operating permit as well. The criteria indicating which sources must obtain an operating permit are specified in R307-415 of the UAC. As with the NSR Permit or approval order, potential applicants are encouraged to contact DAQ prior to submitting the necessary paperwork.

Another significant purpose or objective of the Title V program is to shift the compliance liability from the regulating agency to the permitted source. Each year the source must certify that it is in compliance with all permit terms and conditions, or indicate non-compliance issues. False reports have criminal implications, not just the civil liabilities of other violations. In addition, sources must report the results of monitoring at least every six months. Permit provisions for monitoring, record keeping and reporting are added or enhanced to assure compliance with the permit conditions and limits.

During 2004, the Operating Permits Section issued several permit modifications, coordinating extensively with the NSR Section. The operating permit has a life of only five years (as opposed to the approval order that does not expire), and in 2004 the Section issued several permit renewals. These renewal permits must ensure that new federal requirements for the Compliance Assurance Monitoring Rule (CAM) and any other new requirements (such as new MACT Standards) are included as appropriate.

## **Small Business Assistance Program**

The Small Business Assistance Program (SBAP) helps small businesses understand and comply with state air quality rules. The SBAP provides “plain language” educational information to help small sources learn about the many air quality requirements, and also provides on-site assistance with process evaluation, compliance assistance, and pollution prevention techniques.

Another function of the SBAP is to incorporate the advice of a Small Business Ombudsman and a Small Business Advisory Panel that is appointed by the Legislature. These additional services are designed to provide education to small businesses outside of the regulatory environment, and also to provide feedback to the SBAP regarding program effectiveness. All of these services are free of charge. A toll-free telephone hotline (1-800 270-4440) provides access to SBAP services 24 hours a day / seven days a week.

## **COMPLIANCE ACTIVITIES**

The Compliance and the Hazardous Air Pollutants Sections are responsible for ensuring that all regulatory requirements are met. This is done through inspections, emission testing, review of periodic reports from industry, and enforcement.

### **Inspection and Enforcement**

The DAQ regulates more than 2,000 facilities within the state through approval orders, state rules and federal emission standards. Annual inspections encourage these facilities to maintain continuous compliance with the rules and permit conditions. Possible enforcement actions, which may lead to financial penalties or additional regulatory requirements, provide incentive for source operators to see that these conditions are taken seriously. The Compliance Section averages roughly 1,400 inspections per year. The inspectors also respond to about 350 complaints each year, and frequently conduct drive-by observations of visible emissions.

Should enforcement actions become necessary, DAQ may issue written warnings called Source Compliance Action Notices (SCANs), or Notices of Violation (NOVs) with compliance orders. SCAN warnings are usually reserved for first-time offenders with minor infractions. NOVs are used whenever there are significant violations of the rules or permit conditions, and the violator may be fined as much as \$10,000 per day per violation. Most of the violations are resolved with a settlement agreement between the Executive Secretary and the operator, saving time and court costs. Early settlement compliance advisories provide incentives for source operators to address these issues in a timely manner. Settlements may also include supplemental environmental projects. These are environmentally beneficial projects that a violator agrees to undertake as a way to offset some or all of a civil penalty.

### **Stack Test Audits**

Regulated sources are required to conduct periodic stack tests in order to verify that their facilities are operating properly. Some of the largest sources maintain continuous emissions monitors that record real-time emission rates and concentrations around the clock. In either case, DAQ personnel will audit the records and reports to ensure that the testing was done in accordance with EPA reference methods.

### **Hazardous Air Pollutants Section (HAPs)**

The Hazardous Air Pollutants Section determines compliance with specific regulations involving the emission of hazardous air pollutants. The following programs currently reside within the HAPs Section:

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP), 40 CFR (Code of Federal Regulations) Part 61 (R307-214-1) - HAPs presently oversees 12 sources operating under these regulations due to emissions of asbestos, beryllium, benzene waste, or radon from uranium mill tailings.

NATIONAL EMISSION STANDARDS FOR SOURCE CATEGORIES - MAXIMUM ACHIEVABLE CONTROL TECHNOLOGY (MACT), 40 CFR Part 63 (R307-214-2) - These regulations cover the emission of 187 additional hazardous air pollutants, and sources of these pollutants are required to apply controls that are equivalent to what is in service for the “best controlled 12%” of all such operations in the nation. Utah presently oversees about 225 sources that must comply with these regulations.

LEAD-BASED PAINT - TOXIC SUBSTANCES CONTROL ACT (TSCA) Title IV, 40 CFR Part 745 (R307-840) - Under this program, HAPs deals with the accreditation of training programs, certification of individuals and firms, and work practices for lead-based paint activities, and lead-based paint outreach activities.

ASBESTOS IN SCHOOLS – TSCA TITLE II ASBESTOS HAZARD EMERGENCY RESPONSE ACT (ASHERA), 40 CFR Part 763 (R307-801) - Under this program, HAPs deals with the approval of training providers, certification of individuals and companies, inspections of school buildings, and inspections of asbestos abatement in schools.

ASBESTOS NESHAP AND STATE ASBESTOS WORK PRACTICES - 40 CFR Part 61, Subpart M, R307-801 - Under this program, HAPs deals with the certification of individuals and companies, review of asbestos project notifications, review of demolition notifications for structures, review of alternate work practices, inspection of asbestos abatement projects and demolition of structures, and asbestos outreach activities.

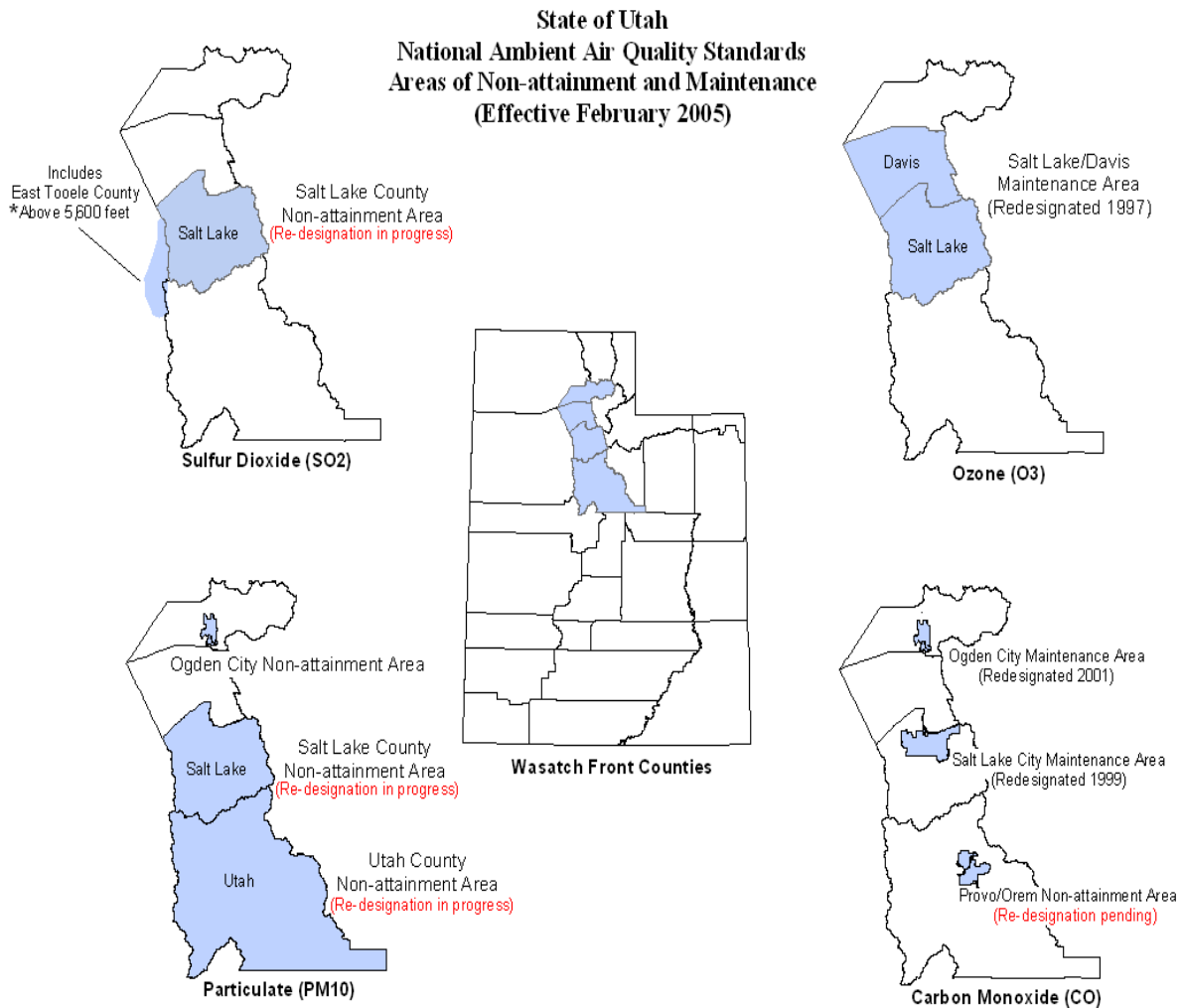
## **OUTREACH**

DAQ holds regular workshops to help industries understand permitting and compliance issues. The goal is to achieve 100% compliance with air quality regulations. Additional information can be found at the DAQ compliance website through DAQ homepage at <http://www.airquality.utah.gov>.

## **Frequently Asked Questions**

*What are Utah’s nonattainment areas?* Figure 12 is a map of the current nonattainment and maintenance areas within the state. A maintenance area is an area that was once designated as nonattainment, and which subsequently attained and can maintain the particular standard for a period of 10 years. EPA must approve the demonstration and publish the redesignation in the Federal Register.

**Figure 12**



*How do I get an air quality permit?* The first step is to contact the DAQ at (801) 536-4000 and ask to speak with the New Source Review Section. Permit application forms, worksheets, and instructions etc. can also be found on DAQ's website at <http://www.airquality.utah.gov/PERMITS/pmthome.htm>. After submitting a permit application it is a good idea to request a copy of "The Methodology" to ensure that the required application information is complete.



## **DEFINITIONS**

AO – Approval Order

AQI – Air Quality Index

ASHERA – Asbestos Hazard Emergency Response Act

BACT – Best Available Control Technology

BEIS – Biogenic Emissions Inventory System

CAA – Clean Air Act

CAM – Compliance Assurance Monitoring

CAST – Center for Automotive Science and Technology

CFR – Code of Federal Regulations

CO – Carbon Monoxide

Criteria Pollutants - Pollutants for which EPA sets standards to protect public health

DAQ – Division of Air Quality

DEQ – Department of Environmental Quality

EPA – Environmental Protection Agency

FDMS – Filter Dynamics Monitor System

HAPs – Hazardous Air Pollutants

KUCC – Kennecott Utah Copper Corporation

MACT – Maximum Available Control Technology

MPO – Metropolitan Planning Organization

$\mu\text{g}/\text{m}^3$  – Micrograms per cubic meter

Micron – One millionth of a meter

NAAQS – National Ambient Air Quality Standards

NESHAP – National Emissions Standards for Hazardous Air Pollutants

NH<sub>3</sub> – Ammonia

NOI – Notice of Intent

NO<sub>2</sub> – Nitrogen Dioxide

NOV – Notice of Violation

NO<sub>x</sub> – Nitrogen Oxides

NSPS – New Source Performance Standard

NSR – New Source Review

O<sub>3</sub> - Ozone

PM – Particulate Matter

PM<sub>10</sub> – Particulate matter smaller than 10 microns in diameter

PM<sub>2.5</sub> – Particulate matter smaller than 2.5 microns in diameter

ppm – Parts per million

SBAP – Small Business Assistance Program

SCAN – Source Compliance Action Notice

SIPs – State Implementation Plan

SO<sub>2</sub> – Sulfur Dioxide

SO<sub>x</sub> – Sulfur Oxides

TSCA – Toxic Substances Control Act

VOC – Volatile Organic Compounds

UAC – Utah Administrative Code

USU – Utah State University